REMARKS

Reconsideration and allowance of the claims of the present application, as amended, are respectfully requested.

Before addressing the specific grounds of rejection raised in the outstanding Office Action, applicants have amended Claims 1, 2, 7, 8 and 9, cancelled Claims 10-21, and added new Claims 22 and 23. Specifically, applicants have amended Claim 1 to positively recite a semiconductor structure, such as illustrated in FIG. 3, including a first strained layer 120 of semiconductor material doped of a first dopant type *located* on a substrate 110; a source region (one of 180) and a drain region (another one of 180) implanted with dopants of a second opposite type *located at least within said first strained layer* 120; a gate electrode 170 separated from the first *strained* layer 120 by a dielectric region 160, and positioned between said source and drain regions (regions 180); said substrate 110 having one or more threading dislocations 130, misfit dislocations 140 or crystal defects that extend continuously from the source region to the drain region at an interface 22 between said first strained layer 120 of semiconductor material and said substrate 110, and *a peak concentration of blocking impurity dopant materials 190 selected from the group consisting of In, Pb, Sb and Sn located substantially at said interface 22, wherein said blocking impurity dopant materials 190 partially or fully occupy each of said one or more threading dislocations 130, misfit dislocations 140 or crystal defects at said interface 22 and substantially inhibit diffusion of said implanted source and drain dopants from diffusing along said threading dislocations 130, misfit dislocations 140 or crystal defect along said interface 22.* In addition to FIG. 3, further support for the above amendments to Claim 1, particularly

regarding the peak concentration of impurity dopant materials, is found at paragraph 0025 of the originally filed application.

With respect to Claim 2, the term "first layer" was changed to "first strained layer" to match the terminology used in Claim 1 of the instant application.

With respect to Claims 7-9, the dependency of each claim was changed to new Claim 22.

Newly added Claims 22-23 are supported throughout the originally filed application. See, for example FIGS. 3-5 and related text describing those drawings and paragraphs 0024-0025.

Since the above amendments to the claims do not introduce new matter into the originally filed application, entry thereof is respectfully requested.

In the outstanding Office Action, Claims 7-9 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly indefinite for failing to particularly point out and distinctly claim the subject matter that the applicants regard as their invention. Specifically, the Examiner avers that the subject matter recited in Claims 7-9 is broader than the subject matter recited in Claim 1. As such, Claims 7-9 fail to further limit the subject matter of Claim 1.

Applicants respectfully submit that the above amendments made to Claims 7-9 obviate the indefiniteness rejection. As such, reconsideration and withdrawal of the indefiniteness rejection are respectfully requested.

Claims 7-9 stand rejected under 35 U.S.C. § 102(e) as allegedly anticipated by U.S. Patent No. 6,849,527 to Xiang et al. ("Xiang et al."). Claims 1, 2 and 4-9 stand rejected under 35 U.S.C. § 103 as allegedly unpatentable over the combined disclosures of Xiang et al. and U.S. Patent No. 6,432,802 to Noda et al. ("Noda et al").

Concerning the § 102 rejection, it is axiomatic that anticipation under § 102 requires that the prior art reference disclose each and every element of the claim to which it is applied. In re King, 801 F.2d, 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1986). Thus, there must be no differences between the subject matter of the claim and the disclosure of the prior art reference. Stated another way, the reference must contain within its four corners adequate direction to practice the invention as claimed. The corollary of the rule is equally applicable: Absence from the applied reference of any claimed element negates anticipation. Kloster Speedsteel AB v. Crucible Inc., 793 F.2d 1565, 1571, 230 USPQ 81, 84 (Fed. Cir. 1986).

Applicants observe that Claims 7-9 are now dependent on newly added Claim 22. As such, and in order for Xiang et al. to anticipate the features recited in dependent Claims 7-9, the applied reference must disclose each and every element within newly added Claim 22. Applicants respectfully submit that Xiang et al. does not teach each and every element within newly added Claim 22. Specifically, Xiang et al. does not disclose a semiconductor structure which includes a peak concentration of blocking impurity dopant materials located substantially at said interface, wherein said blocking impurity dopant materials partially or fully occupy each of said one or more threading dislocations, misfit dislocations or crystal defects at said interface and substantially inhibit diffusion of said implanted source and drain dopants from diffusing along said threading dislocations, misfit dislocations or crystal defect along said interface.

Xiang et al. discloses a semiconductor structure in which carbon atoms are ion implanted into a strained Si layer in order to improve the spacing within the strained Si layer and thus impart additional strain within that layer. See, for example, the abstract and col. 4, line 66-col. 5, line 2 of Xiang et al. Applicants observe that Xiang et al. does not provide any indication where

the peak concentration of implanted C is located, let alone that the peak concentration is located substantially at the interface between the strained Si layer and the underlying semiconductor substrate, as presently claimed. Applicants observe that in Xiang et al. C is implanted within the strained Si layer to increase strain within the strained Si layer relative to the underlying SiGe substrate. As such, the location of the peak concentration of C within Xiang et al. is not so important as long as the C is implanted within the stained Si layer.

In view of the above amendments and remarks, the anticipation rejection citing Xiang et al. has been obviated. Reconsideration and withdrawal of the instant § 102(e) rejection are thus respectfully requested.

Applicants further observe that newly added Claim 23 is not anticipated by Xiang et al. for the same reasons that newly added Claim 22 and dependent Claims 7-9 are not anticipated by Xiang et al. In addition, Xiang et al. does not teach or suggest the claimed peak concentration of ion impurity range as recited in newly added Claim 23. Indeed, Xiang et al. does not provide any concentration range for the C implant within the disclosure.

The foregoing remarks clearly demonstrate that the applied reference does not teach each and every aspect of the claimed invention, as required by King and Kloster Speedsteel; therefore the claims of the present application are not anticipated by the disclosure of Xiang et al. Applicants respectfully submit that the instant § 102 rejection has been obviated and withdrawal thereof is respectfully requested.

With respect to the § 103 rejection citing Xiang et al. and Noda et al., applicants respectfully submit that applicants' claimed structures as recited in amended Claim 1 and newly added Claims 22 and 23 are not rendered obvious by the combination of applied reference.

Specifically, the combination of Xiang et al. and Noda et al. does not teach or suggest a semiconductor structure in which *a peak concentration of blocking impurity dopant materials selected from the group consisting of In, Pb, Sb and Sn is located substantially at an interface between a strained semiconductor layer and a substrate, wherein said blocking impurity dopant materials partially or fully occupy each of said one or more threading dislocations, misfit dislocations or crystal defects at said interface and substantially inhibit diffusion of said implanted source and drain dopants from diffusing along said threading dislocations, misfit dislocations or crystal defect along said interface,* as recited in amended Claim 1, or a semiconductor structure in which *a peak concentration of blocking impurity dopant materials is located substantially at said interface, wherein said blocking impurity dopant materials partially or fully occupy each of said one or more threading dislocations, misfit dislocations or crystal defects at said interface and substantially inhibit diffusion of said implanted source and drain dopants from diffusing along said threading dislocations, misfit dislocations or crystal defect along said interface*, as recited in newly added Claim 22, or a semiconductor structure in which *a peak concentration of blocking impurity dopant materials having a concentration between* 10^{17} cm^{-3} *to* 10^{19} cm^{-3} *is located substantially at said interface, wherein said blocking impurity dopant materials partially or fully occupy each of said one or more threading dislocations, misfit dislocations or crystal defects at said interface and substantially inhibit diffusion of said implanted source and drain dopants from diffusing along said threading dislocations, misfit dislocations or crystal defect along said interface*, as recited in newly added Claim 23.

The principle reference, i.e., Xiang et al., spurring the obviousness rejection is defective for the same reason as mentioned above with respect to the anticipation rejection. As such, the

remarks made with respect to Xiang et al., concerning the anticipation are incorporated herein by reference. To reiterate: Xiang et al. discloses a semiconductor structure in which carbon atoms are ion implanted into a strained Si layer in order to improve the spacing within the strained Si layer and thus impart additional strain within that layer. See, for example, the abstract and col. 4, line 66-col. 5, line 2 of Xiang et al. Applicants observe that Xiang et al. does not provide any indication where the peak concentration of implanted C is located, let alone that the peak concentration is located substantially at the interface between the strained Si layer and the underlying semiconductor substrate, as presently claimed. See applicants' Claims 1, 22 and 23.

Applicants observe that in Xiang et al. C is implanted within the strained Si layer to increase strain within the strained Si layer relative to the underlying SiGe substrate. As such, the location of the peak concentration of C within Xiang et al. is not so important as long as the C is implanted within the stained Si layer. Applicants further observe that Xiang et al. does not indicated applicants' claimed peak concentration, as recited in amended Claim 23. Indeed, the applied reference provides no content of the C that is being implanted within the strained Si layer.

The above defects within Xiang et al. are not alleviated by the applied secondary reference of Noda et al. Noda et al. provides a method of fabricating a semiconductor structure in which an amorphous layer is formed into a semiconductor region by implanting heavy ions with a large mass using a previously formed gate electrode as an ion implantation mask. Applicants observe that in Noda et al. substrate 100 is shown as a single material. As such, Noda et al. does not teach or suggest a structure including a strained semiconductor layer located atop a substrate in which an interface is present between the two material layers. Since no interface is

present between a strained semiconductor layer and an underlying substrate within Noda et al., the applied reference cannot and does not teach or suggest a structure in which *a peak concentration of blocking impurity dopant materials is located substantially at said interface, wherein said blocking impurity dopant materials partially or fully occupy each of said one or more threading dislocations, misfit dislocations or crystal defects at said interface and substantially inhibit diffusion of said implanted source and drain dopants from diffusing along said threading dislocations, misfit dislocations or crystal defect along said interface*, as is positively recited in the claims of the present application.

Applicants observe that the Examiner relies on the halo implants within Noda et al. for allegedly teaching utilizing the use of In, Pb, Sb and Sn. Applicants submit in this regard that In, Pb, Sb and Sn are used to form halo implants that are located within a doped layer 103 of semiconductor substrate 100 as provided in Noda et al. After annealing, the halo implants are activated forming doping pockets 106A that are located beneath the source/drain regions 105A. See FIG. 1C of Noda et al. As illustrated, the peak concentration of the doping pockets within Noda et al. is not located substantially at an interface between a strained semiconductor layer and an underlying substrate, as presently claimed.

The § 103 rejection also fails because there is no motivation in the applied references which suggest modifying the disclosed structures to include the various elements recited in the claims of the present invention. Thus, there is no motivation provided in the applied references, or otherwise of record, to make the modification mentioned above. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification

obvious unless the prior art suggested the desirability of the modification." In re Vaeck, 947 F.2d, 488, 493, 20 USPQ 2d. 1438, 1442 (Fed.Cir. 1991).

The rejection under 35 U.S.C. § 103 has been obviated; therefore reconsideration and withdrawal thereof is respectfully requested.

Thus, in view of the foregoing amendments and remarks, it is firmly believed that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,

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